



DoD Shelf-Life Material Management Via Radio Frequency Identification

Technology
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Outline of Brief

DoD Requirements

Shelf-Life Management Issues

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DoD Requirements

- DoN S&T Requirements
 - Logistics and Maintenance; 8.1.a, 8.1.c
 - EQ, Environmental Sensors and Processes; 13.1.b
- OPNAV User Requirements
 - Excess Hazardous Material Minimization; 3.I.11.b
 - Reuse/Recycle of Hazardous Materials; 3.I.13.a



Shelf-Life Management Issues

- DoD shelf-life materials are purchased through a multitude of procurement channels
- Once procured, materials are difficult to track
- New material is currently being procured, while identical material remains unused in storage
- Material location and transfer history are typically unknown
- Storage conditions are not recorded or analyzed for potential premature material degradation
- Consumption and disposal records typically do not concur with procurement records, resulting in an inaccurate mass balance of material
- Current DoD inventory management and control are laborious and time consuming



Previous Research Effort

- Proposed Navy coating condition assessment sensor system was investigated by NSWCCD, ARL/PSU, and McDermott Technology, Inc..
- Coatings are continuously reformulated, each requiring laboratory testing and analysis to define the usability limits of each coating
- Permittivity measurements are too sensitive making the proposed field based sensor system susceptible to environmental influences and not feasible for field deployment

RFID Technology Assessment

- Several commercially available RFID sensors:
 - Active
 - Large in size
 - Powerful battery incorporated
 - Constantly transmitting data
 - Furthest data transmission range (300 feet)
 - Semi-active
 - Smaller RFID device
 - Battery power is ramped to transmit data when queried
 - 12 foot transmission range
 - Passive
 - Smallest RFID device
 - No battery incorporated
 - 3 inch transmission range



Technology Solution

- The most appropriate RFID classes are being pursued
 - Semi-active and passive tags are being investigated
 - Active RFID tags are too large and costly
- Pertinent shelf-life information will be incorporated into RFID tag coding system for inventory control and management of each procured item
- RFID tags will transmit unique identification number codes that will be input into a national database (to be developed)
- Unique tag numbers will be encoded with the following:
 - National Stock Number
 - Manufacturer identification
 - Material lot number
 - Date of production
 - Expiration date



Technology Implementation

- DoD procured items will have RFID tags to manage and track each unit of issue
- DoD field activities will each have the capability to read the standardized RFID tags
- Field activities will also be able to upload transfer of custody and inventory information into the national database
- Database will provide information and access to stored materials that are available for transfer
- Extraction of data will provide an accurate mass balance of procured and disposed DoD shelf-life materials



Conclusions

- DLA will have the capability to monitor all DoD shelf-life items
- RFID tags will provide access to critical shelf-life information for inventory control and management
- Procurement and disposal costs of shelf-life items will be reduced through improved and efficient material redistribution and transfer
- DLA will be able to extract accurate procurement and disposal information from the national database, accounting for each DoD shelf-life item



Future Efforts

- Pursue most appropriate RFID tag class for shelf-life management, considering field activity usage parameters
- Partner with RFID manufacturers to incorporate shelf-life information coding into RFID protocol standards
- Determine minimum units of issue for shelf-life items being tagged, taking into consideration RFID device cost
- Integrate shelf-life material management into database infrastructure, facilitating information inquiries and data uploading